Evidence-based Practice Center
Systematic Review Protocol

Project Title: Routine Preoperative Testing: Comparative Effectiveness Review

I. Background and Objectives for the Systematic Review

Traditionally, preoperative testing has been part of the preoperative care process to inform patient selection by determining fitness for anesthesia and identifying patients at high risk of postoperative complications. Routine preoperative tests are defined by the American Society of Anesthesiologists as those done in the absence of any specific clinical indication or purpose and typically include a panel of blood tests, urine tests, chest radiography, and an electrocardiogram (ECG).[1,2] These tests are performed to find latent abnormalities—such as anemia or silent heart disease—that could impact how, when, or whether the planned surgical procedure and concomitant anesthesia are performed.

Many hospitals have instituted rules to perform a series of laboratory tests prior to any operative procedure under the assumption that a larger amount of information would enhance safety for surgical patients and reduce liability for adverse events.[2] During the past three decades, routine preoperative testing has been challenged by several academic publications that have identified a sizable cost of testing without significant benefits to patients.[3-8] Preoperative testing is estimated to cost the United States $18 billion annually.[2] In addition to increased cost of surgical care,[2] nonselective preoperative testing may result in false-positive or borderline results (in the absence of a clinical indication) requiring further investigation. Additional investigation may cause unnecessary psychological and economic burdens, postponement of surgery, and even morbidity and mortality as a result of unnecessary evaluation (e.g., complications due to unnecessary biopsies performed to follow up false-positive laboratory tests).[2] It is unclear whether the benefits accrued from responses to true-positive tests outweigh the harms of false-positive preoperative tests and, if there is a net benefit, how this benefit compares to the resource utilization required for testing. An alternative to routine preoperative testing for the purpose of determining fitness for anesthesia and identifying patients at high risk of postoperative complications may be to conduct a history and physical examination, with selective testing based on the clinician's findings. However, the relative effect on patient and surgical outcomes, as well as resource utilization, of these two approaches is unknown.

Patients undergoing surgery are not homogenous and have considerable variation in demographic characteristics, underlying health and comorbidities, indications for surgery, specific surgery planned, type of anesthesia planned (e.g., general vs. spinal anesthesia), and other factors. Differences among all these factors may result in differences in the benefits of finding abnormalities (e.g., anemia) and in the potential harms of testing (e.g., delayed surgery or unnecessary colonoscopy). Therefore, it is important to look not only at the benefits and harms of preoperative testing in general but also at specific patient and intervention (surgery-

related) factors that might change the balance between the benefits and harms, namely, the risk of the surgical procedure, the type of anesthesia planned, the indication for surgery, any comorbidities, and other patient characteristics.

How preoperative testing is implemented is another important factor. Preoperative testing can be performed in numerous ways. For some procedures, testing may truly be routine such that all patients undergo testing prior to the procedure. This may be the practice by some hospitals for cataract surgery. Testing may also be performed according to a protocol, for example, only if patients meet certain criteria such as age or past medical history of cardiovascular disease. Per-protocol testing can be considered to be a subset of routine preoperative testing. Testing could be performed in an elective manner, fully at the discretion of the ordering clinician based on an individualized assessment of the patient's medical history and perceived risks. Elective testing would not be considered to be routine.

Inefficiencies in the preoperative testing processes or failures in the handoff of test results between primary care physicians, surgeons, and anesthesiologists ultimately affect the clinical utility of preoperative testing. Different hospitals, surgeons, and anesthesiologists have different protocols for obtaining preoperative testing including, but not limited to, elective testing by the surgeon or anesthesiologist, referral to primary care physicians for testing at their discretion, and dedicated clinics with standardized protocols based on the individual patient's health status and planned surgery. This variability in care practices raises questions about whether elective testing results in underutilization and/or overutilization of tests (balancing benefits and harms) when compared with per-protocol testing and whether tests ordered and followed up by different disciplines or types of clinicians have equivalent clinical utility. Examples of potentially ineffective testing due to process failures include tests performed by primary care physicians whose results are not transmitted to or are not followed up by surgeons or tests done by anesthesiologists that are not transmitted to or followed up by primary care physicians. There remains a lack of knowledge as to whether patient outcomes differ based on differences in testing protocols.

A final factor that needs to be considered is the timing of the tests. Hospitals or surgical centers may dictate that preoperative testing must be done within a limited period of time before surgery, such as 30 days or 6 months. Anecdotally, this results in changes in surgical practice, such as performing a second eye cataract surgery earlier than would otherwise be indicated so that preoperative testing does not have to be repeated. However, it is unknown whether there is adequate evidence to support any particular time threshold for preoperative tests.

Three professional medical associations nominated this topic for systematic review citing the wide variation in clinical practice on the topic, the need for a guideline for routine preoperative testing, and the likelihood that a comparative effectiveness review on this subject would have broad clinical impact—particularly if such a review included the most commonly ordered tests for healthy patients and for those with comorbidities undergoing a wide variety of high- and low-risk surgeries.

Although the National Institute for Health and Clinical Excellence (NICE) in the United Kingdom published an evidence-based review and guideline titled *The Use of Routine Preoperative Tests for Elective Surgery* in 2003,[10] there have been no recent systematic reviews, including Agency for Healthcare Research and Quality (AHRQ) reports, comprehensively covering this topic. The American College of Cardiology and the American Heart Association also published a guideline on perioperative cardiovascular evaluation in 2007[9] that, in part,

covered routine preoperative tests before cardiovascular surgery and routine preoperative cardiovascular tests (e.g., transesophageal echocardiography) for noncardiovascular surgery, but their review was considerably narrower in scope than the current review under consideration.

Assessing the Clinical Utility of Preoperative Testing

The impact of preoperative testing on patient-relevant outcomes is both direct and indirect. Direct patient-relevant effects of testing include emotional and cognitive changes conferred by testing and its results; any harms associated with the testing procedure (e.g., pain, hemorrhage or bruising from a blood draw, exposure to ionizing radiation for imaging tests, risk of contrast-induced nephropathy); and costs to the patient (in the form of time spent or copayments). For the most part, however, testing has indirect effects:

- Test results can influence treatment (e.g., surgical) choices and, through them, patient outcomes (e.g., a previously unknown test abnormality may confer an increased risk of surgical mortality; the surgery may thus appropriately be cancelled).
- Testing can prolong time to treatment for logistical reasons (either appropriately to allow correction of or further treatment due to an abnormal test result or unnecessarily if no further treatment or evaluation was truly needed).
- Aberrant test results may lead to cascade testing (either appropriate if the test result signals a real abnormality or unnecessary if the test result was spurious or was not due to a clinically important abnormality).

Therefore, when assessing the clinical effects of testing, we need to assess the clinical utility of patient-management strategies that include testing and its downstream indirect effects.

At the systems level, the volume of testing has direct impact on resource utilization and costs. Further, unnecessary testing can overload resources with limited bandwidth (e.g., imaging), representing at a minimum managing and scheduling overhead. These effects of alternative testing strategies on resource utilization can be addressed by cluster randomized studies or even with interrupted time series.

II. The Key Questions

Question 1

How do routine preoperative testing strategies compare to no testing or alternative testing strategies with respect to outcomes—including perioperative clinical outcomes, quality of life or satisfaction, periprocedural patient management decisions, and resource utilization—among patients undergoing elective surgical procedures? Stratify and compare outcomes by:

a. The risk of the surgical procedure, the type of anesthesia planned, the indication for surgery, comorbidities, or other patient characteristics?
b. The structure of testing (e.g., routine for everyone vs. per protocol) or by who orders the tests (e.g., surgeon vs. anesthesiologist vs. primary care physician)?
c. The length of time prior to the procedure that the tests are conducted?

Question 2

What are the harms of routine preoperative testing strategies when compared with no testing or with alternative testing strategies? Stratify and compare harms by:

a. The risk of the surgical procedure, the type of anesthesia planned, the indication for surgery, comorbidities, or other patient characteristics?
b. The structure of testing (e.g., routine for everyone vs. per protocol) or by who orders the tests (e.g., surgeon vs. anesthesiologist vs. primary care physician)?

The Key Questions (KQs), along with background information and suggestions for refinement of the topic and protocol were made publicly available through November 2012. Overall, the comments were highly positive and strongly supportive of this comparative effectiveness review. No suggestions were made to alter the KQs, but instead they focused on ensuring that certain aspects of the questions be highlighted.

The protocol has also been presented to and discussed with a Technical Expert Panel (TEP) assembled specifically for this review. This final protocol incorporates revisions based on this discussion.

It is important to note the constraints of the KQs in regard to this review. The review will focus on studies that compare routine preoperative testing versus no routine testing (or other strategies) because this is the only design that can demonstrate whether testing an unselected population before surgery leads to better outcomes for those patients. The review will not evaluate questions that are important and related to the topic at hand but that would require assumptions about what outcomes might have occurred without testing (e.g., studies that reported complications only in patients who underwent testing) or assumptions about how testing might improve outcomes given different rates of complications among patients with abnormal and normal preoperative tests. Specifically:

1. We will not base assessments of the benefits and harms of preoperative testing on the incidence of perioperative complications (such as major bleeding). Two examples of such an analysis would be (1) a study that found no perioperative cardiac events and thus concluded that a preoperative ECG would not have been of value, and (2) a study that found potentially preventable episodes of clinically significant postoperative bleeding and thus concluded that a preoperative bleeding-time test could have been of value. While these studies make conclusions regarding the possible value of testing, they do not provide evidence regarding the actual effect of routine preoperative tests.

2. We will not systemically review what the prevalence rates of abnormal test results are for different populations of patients undergoing surgery. Some studies have reported that since a given percentage of patients have an abnormal preoperative test (such as a chest radiograph) and that the surgical and anesthesia teams could alter their care based on these abnormalities, patients could, therefore, benefit from the test. However, such studies again do not provide evidence that actually ordering the test would alter perioperative outcomes.

3. We will not systematically review the test performance (e.g., sensitivity and specificity) of any of the tests. To systematically review test performance would require a broader review of each test—beyond routine preoperative testing—than will be conducted to answer the given KQs. Further, test performance without patient outcomes does not directly address the value of routine preoperative testing.

4. We will not assess test results (i.e., abnormal vs. normal test results) as predictors of outcomes. The goal of this review is to assess whether actually ordering routine preoperative tests alters care and patient outcomes. We will not evaluate what the predictors of clinical outcomes are, including abnormal test results. For example, we will not evaluate whether patients with abnormal ECG results are at higher risk of perioperative complications than patients with normal ECG results. Instead, we will be evaluating whether patients who had ECGs performed routinely had different outcomes than patients who did not.

Table 1 lists the key properties of the studies of interest.

Table 1. Study eligibility criteria

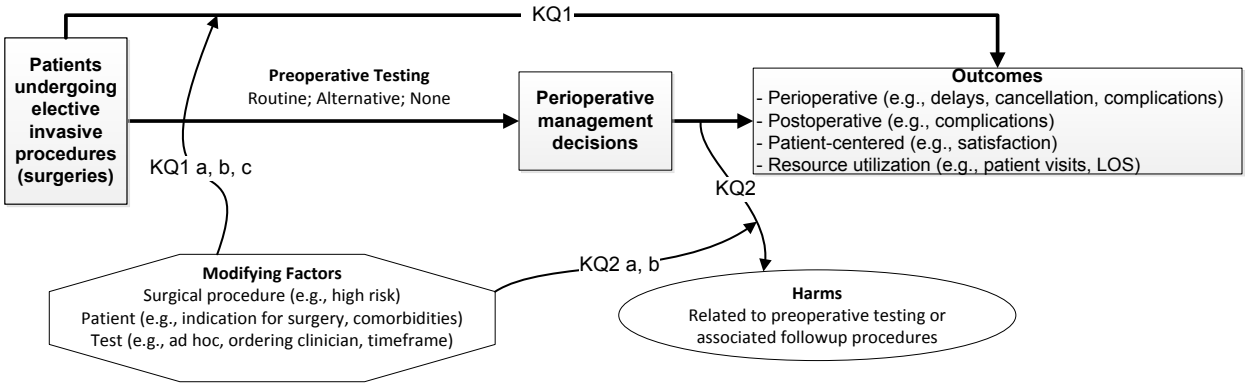
Domain	Criteria
Population	• Patients undergoing any elective or ambulatory surgical or other invasive procedure that commonly requires anesthesia or sedation of any type or approach that is administered by an anesthesia team member; cataract surgery will be included regardless of local practice regarding anesthesia or sedation • Patients undergoing procedures in any setting, including inpatient, outpatient, and office-based • Patients in any category of risk for surgical or anesthesia complications • Patients undergoing surgical procedures in any risk category ranging from minor and minimally invasive through high risk, maximally invasive surgeries (e.g., vascular, neurologic, thoracic, abdominal, and pelvic surgeries) • Exclude patients undergoing nonsurgical diagnostic procedures that may require anesthesia or sedation (e.g., biopsy, colonoscopy) • Include patients of all ages
Interventions	• Patient management strategies that include routine preoperative testing (testing done in everyone having a given surgery regardless of any indication from history or physical) or

Domain	Criteria
	per protocol testing (testing done in specific groups of people having a given surgery based on broad risk categories; e.g., older age, history of cardiovascular disease). To include any preoperative test evaluated by an eligible study. Examples include: ○ Electrolytes (e.g., sodium, potassium, bicarbonate, chloride) ○ Kidney function tests (e.g., blood urea nitrogen, creatinine, glomerular filtration rate) ○ Liver function tests (or other components of a "complete metabolic panel") ○ Glycemia measures (e.g., glucose, hemoglobin A1c) ○ Blood counts (e.g., hemoglobin, hematocrit, white blood cells, platelets) ○ Bleeding and coagulation tests (e.g., prothrombin time, bleeding test) ○ Hemoglobinopathy tests (e.g., sickle cell) ○ Urinalysis ○ Pregnancy tests ○ Chest radiography ○ 12-lead ECG ○ Cardiac stress testing ○ Basic echocardiography ○ Pulmonary function tests • Exclude costly and invasive testing that would not be expected to be performed routinely. Examples include: ○ Computed tomography or magnetic resonance imaging tests ○ Tests requiring markers or dyes (e.g., thallium stress testing) ○ Invasive tests (e.g., angiography) • Exclude testing performed for the purpose of diagnosis or staging the disease for which surgery is being performed or for specific surgical planning (e.g., imaging tests for extent of cancer, pulmonary function testing before lobectomy) • Exclude factors from patient history, physical examination, demographic features, et cetera
Comparators	• KQs 1 and 2: Patient management strategies that do not include routine preoperative testing or that include only patient history and physical examination with selective testing (or variations thereof) or alternative testing strategies (i.e., different combinations of tests) • KQs 1b and 2b: Patient management strategies that include different testing system structures or protocols (e.g., in everyone vs. only in people meeting broad criteria such as being of older age) or different person or clinic/center ordering the tests (e.g., surgeon vs. anesthesiologist vs. primary care physician; preanesthesia clinic vs. patient's physician) • KQ 1c: Different duration of time between when the test was done and when the surgery occurred
Outcomes	• General outcomes of interest: Surgical complications, perioperative morbidity, perioperative mortality, delays in surgery, cancellation of surgery, harms from followup of abnormal tests, patient satisfaction, and resource utilization • Key Question 1: ○ Clinical and other patient-centered outcomes ▪ Procedure or anesthesia delay ▪ Procedure cancellation ▪ Perioperative mortality ▪ Perioperative surgical complications ▪ Patient quality of life ▪ Patient satisfaction ▪ Patient resources, including time and lost work

Domain	Criteria
	▪ Unplanned hospital admission or readmission within 30 days ▪ Change in disposition of care (e.g., unplanned intensive care unit admission) ▪ Length of hospital stay ▪ Other resource utilization, including unplanned followup tests or procedures ○ Intermediate outcomes ▪ Changes to perioperative patient management (other than procedure delay or cancellation) • Key Question 2: ○ Clinical outcomes (adverse events) ▪ Unnecessary/inappropriate procedure or anesthesia delays (based on an adjudication decision regarding appropriateness) ▪ Unnecessary/inappropriate procedure cancellation (based on an adjudication decision regarding appropriateness) ▪ Harms from testing or from interventions that resulted from test results ▪ "Unnecessary" followup tests or procedures (i.e., negative followup tests suggesting the preoperative test was false positive; e.g., a normal chest computerized tomography scan performed as followup to an abnormal routine preoperative chest radiograph)
Study design	• Both KQs and outcomes: Comparative studies (one or more interventions being compared to one or more comparators), longitudinal design, prospective or retrospective • Both KQs, selected outcomes: ○ Noncomparative studies (all study participants had the same testing batteries), longitudinal design, prospective or retrospective ○ Only for outcomes where noncomparative data are easily interpretable (i.e., for surgical delays or cancellation due to test results, changes in patient management, harms of unnecessary followup from preoperative tests) • Eligible retrospective studies must clearly include a sample of patients who received routine preoperative testing, not just patients who happened to have preoperative testing done (*elective*) • English-language publication
Timing	• Any (prior to surgery or procedure) Note: the outcomes of interest are short-term (perioperative)
Setting	• Inpatient, outpatient, office-based surgical settings
Minimal important difference (MID)	• For mortality and major or severe life- or health-altering morbidities and complications, the MID is 0 percent when determining that there is a clinically important difference. In other words, all statistically significant differences are deemed to be clinically important. However, to make the determination that there is evidence of no difference, we used a threshold of 20 percent. Thus, only in cases where the 95-percent confidence interval (95% CI) of a difference is within the boundaries of 0.80 to 1.20 (on the odds ratio [OR] scale), will we determine that there is evidence of no important difference. • For other, noncritical outcomes, we will use a MID of 20 percent. To determine that there is evidence of a clinically important difference, the 95% CI of the difference will have to be fully beyond 0.80 or 1.20 (on the OR scale). Alternatively, to determine that there is evidence of no clinically important difference, the 95% CI of the difference will have to fully within the range of 0.80 to 1.20 on the OR scale.

III. Analytic Framework

Figure 1. Draft analytic framework for routine preoperative testing



Abbreviations: KQ = key question; LOS = (hospital) length of stay

IV. Methods

Our comparative effectiveness review (CER) evaluates the effects of routine preoperative tests for elective surgery. The Evidence-based Practice Center (EPC) will review the existing body of evidence on whether the use of routine preoperative testing improves patient outcomes when compared with patients receiving no preoperative testing or alternative testing strategies. The CER will be based on a systematic review of the published scientific literature using established methodologies as outlined in the *Methods Guide for Effectiveness and Comparative Effectiveness Reviews* (hereafter *Methods Guide*) developed by the Agency for Healthcare Research and Quality (AHRQ).[2]

A. Eligibility Criteria

Study eligibility criteria are listed in Table 1 in Section II above. In brief, we will include studies that evaluate outcomes of interest after routine preoperative testing in patients undergoing surgery or procedures requiring anesthesia or sedation—administered by an anesthesia team member—but including cataract surgery regardless of local anesthesia practice.[a] For each type of surgery, comparative studies will compare (1) routine preoperative testing against either no or elective preoperative testing or (2) different routine preoperative testing protocols based on timing of the tests, which specific tests were included, who ordered or followed up on the tests, or in what clinical setting the testing was done while keeping all downstream interventions the same in both instances. We will include and evaluate clinical and

[a]However, we will include cataract surgery regardless of the local anesthesia practice used in the studies. Cataract surgery is commonly, but not universally, performed with an anesthesia team member. As a practical matter, it is known that a large proportion of the evidence will be derived from cataract surgery studies. To exclude these studies would yield an incomplete review of the evidence.

patient-centered outcomes, as listed in Table 1, and changes in perioperative management. To reiterate, we will be reviewing what the value of having routine preoperative testing is, per se. We will *not* be evaluating whether preoperative test results (e.g., abnormal vs. normal pulmonary function testing) are predictors of outcomes, what the test performance of the tests are, or conclusions based on the prevalence of abnormal tests.

B. Literature Search

We will conduct literature searches of studies in MEDLINE®, the Cochrane Central Trials Registry, and the Cochrane Database of Systematic Reviews, the Health Technology Assessment Database, and HealthSTARr (inception to January 2013). All studies, regardless of language and study participant age, will be screened to identify articles relevant to each KQ. Our search includes terms for patient setting and surgery (ambulatory procedures, elective surgery, preoperative), diagnostic test study designs (diagnostic tests, laboratory tests, sensitivity, specificity, etc.), and specific tests (chest radiography, hemoglobin and blood counts, hemostasis, biochemistry, blood sugar, pregnancy tests, sickle cell disease tests, respiratory function tests, and blood gases). The literature search will be reviewed with a research librarian. It will also be tested against a list of known potentially relevant studies to ensure complete sensitivity. Revisions to the search will be made as needed. The Appendix displays the complete search strategy.

We will also review the reference lists from recently published systematic reviews for potentially eligible studies. In addition, articles suggested by TEP members will be screened for eligibility using the same criteria as for the original articles.

We will also be conducting a focused grey literature search to find unpublished or non–peer-reviewed data, in particular the U.S. Food and Drug Administration 510(k) database and abstracts from recent relevant scientific meetings of professional societies. With the assistance of the TEP, we will also be compiling a list of professional organization meetings that were most likely to have published oral presentations and poster abstracts on hypertension management. Based on this list we will retrieve and screen abstracts from conferences. In addition, we will search for ongoing research on routine preoperative tests in the ClinicalTrials.gov registry to identify relevant studies.

All searches will be updated upon submission of the draft report. The report will be updated with the newly found studies during the peer review process.

Scientific Information Packets will not be sought from industry due to the likelihood of a low yield and the tests under consideration are generic and in routine use.

All citations found by literature searches will be independently screened by two researchers. At the beginning of citation screening, we will implement a training session where all researchers screen the same articles and conflicts will be discussed. We will iteratively continue training until we have reached agreement regarding the nuances of the eligibility criteria for screening. During double-screening, we will resolve conflicts as a group. All screening will be done in the open-source, online software Abstrackr (http://sunfire34.eecs.tufts.edu).

C. Data Extraction and Management

Each study will be extracted by one experienced methodologist. The extraction will be reviewed and confirmed by at least one other methodologist. Any disagreements will be resolved by discussion among the team. Data will be extracted into customized forms in a Systematic Review Data Repository online system (http://srdr.ahrq.gov) designed to capture all elements relevant to the KQs. The basic elements and design of these forms will be the similar to those we have used for other CERs and will include elements that address population characteristics including planned surgeries and factors related to surgical and anesthesia risk; descriptions of the preoperative tests and comparators, including timing of the tests; details about who ordered and followed up on the tests and in what setting they were ordered; outcome definitions; sample size; study design; results; and risk of bias assessment. Before extraction, the form will be customized to capture all elements relevant to the KQs. We will test the forms on several studies and revise as necessary before full data extraction.

D. Assessment of Methodological Risk of Bias of Individual Studies

We will assess the methodological quality of each study based on predefined criteria. We will use the Cochrane risk of bias tool,[11] which asks about risk of selection bias, performance bias, detection bias, attrition bias, reporting bias, and other potential biases. We will further use a three-category grading system (good, fair, and poor) to denote the overall methodological quality of each study.[10] This system defines a generic grading scheme that is applicable to varying study designs including randomized controlled trials, nonrandomized comparative trials, cohort, and case-control studies. For randomized controlled trials, we will primarily consider the methods used for randomization, allocation concealment, and blinding and the use of intention-to-treat analysis, the report of dropout rate, and the extent to which valid primary outcomes were described and clearly reported. For all studies, we will use (as applicable): the report of eligibility criteria, the similarity of the comparative groups in terms of baseline characteristics and prognostic factors, appropriate statistical methods to account for confounding, the report of intention-to-treat analysis, crossovers between interventions, important differential loss to followup between the comparative groups or overall high loss to follow-up, and the validity and adequacy of the description of outcomes and results.

E. Data Synthesis

All included studies will be summarized in narrative form and in summary tables that tabulate the important features of the study populations, design, intervention, outcomes, and results. For example, population characteristics will include age, sex, and race; design characteristics will include recruitment and sampling; intervention characteristics will include when tests were ordered and by whom; and outcomes will include mortality, morbidity and quality of life.

We expect to organize the report by type of surgery or procedure, starting with studies that evaluated a broad range of surgeries together and then ranking surgeries by intensity or surgical risk from the most (e.g., cardiothoracic surgery) to the least (e.g., cataract surgery). Within each surgical group, we will have subsections for each test or panel of tests evaluated and will

address both KQs and all their subquestions in the order listed within the KQs. However, this structure may be altered to better fit the distribution of the actual evidence. The organization of the report will be discussed with the TEP.

We are including only clinical outcomes, patient-centered outcomes, and one hospital-process outcome. Therefore, we plan to include all outcomes in tables, summary key results, and assessments of strength of evidence.

A random effects model meta-analysis will be undertaken when there are at least three nonoverlapping studies that are deemed to be sufficiently similar in population, interventions, comparators, and outcomes. The specific analyses to be performed will depend on the available evidence, but it is expected that relative risks or odds ratios of outcomes will be meta-analyzed.

Heterogeneity will be explored qualitatively and, when possible, quantitatively by meta-regression. Of note, several of these characteristics will directly address subquestions of the KQs. Specifically, we plan to explore differences across:

- Types of and indications for surgery
- Types of anesthesia or sedation
- Surgical or anesthesia risk category
- Comorbidities
- Patient age
- Sex
- Surgical setting
- The person who ordered and/or followed up on tests
- Routine (for everyone) or per-protocol testing
- Setting where the tests were ordered
- Timing of the tests
- Study quality and/or design
- Study date

We will explore possible sources of heterogeneity that become apparent upon reviewing the evidence; we will identify these as post-hoc analyses.

F. Grading the Strength of Evidence

We will grade the strength of the body of evidence according to the guidelines on assessing the strength of evidence in the AHRQ *Methods Guide*.[10] As discussed above, given the range of outcomes under consideration, we plan to assess the strength of evidence for each outcome. Following the standard AHRQ approach, within each major category (e.g., type of surgery) and for each outcome, we will assess the number of studies, their study designs, the study limitations (i.e., risk of bias and overall methodological quality), the directness of the evidence to the KQs, the consistency of study results, the precision of any estimates of effect, the likelihood of reporting bias, and the overall findings across studies. Based on these, we will, in group discussion among the whole research team, determine the strength of evidence as being high, moderate, low, or insufficient to estimate an effect.

We plan to incorporate the concept of minimally important differences (MIDs) into the determination of the summary effect (benefit or harm) within the strength of evidence. The MID is the threshold difference in effect to distinguish superiority or equivalence of interventions

(e.g., the upper bound of the 95-percent confidence interval of the relative risk for death would need to be <0.80 for a test-and-treat strategy to be considered clinically superior). In the absence of data-driven definitions of MID in the literature, we solicited the opinion of the TEP for reasonable parameters. See the final row in Table 1 for the MID values to be used.

G. Assessing Applicability

We will assess the applicability within and across studies with reference to American patients scheduled for given surgical procedures. We will evaluate the age, sex distribution, comorbidities, surgical risk, specific planned surgeries, and surgical setting for the study samples. We do not expect the intervention (routine preoperative testing) to be an important factor regarding applicability.

V. References

1. Apfelbaum JL, Connis RT, Nickinovich DG, et al. Practice advisory for preanesthesia evaluation: an updated report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. Anesthesiology. 2012 Mar;116(3):522-38. PMID: 22273990.
2. Kumar A, Srivastava U. Role of routine laboratory investigations in preoperative evaluation. J Anaesthesiol Clin Pharmacol. 2011 Apr;27(2):174-9. PMID: 21772675.
3. Bryson GL. Has preoperative testing become a habit? Can J Anaesth. 2005 Jun;52(6):557-61. PMID: 15983138.
4. Kaplan EB, Sheiner LB, Boeckmann AJ, et al. The usefulness of preoperative laboratory screening. JAMA. 1985 Jun 28;253(24):3576-81. PMID: 3999339.
5. Johnson RK, Mortimer AJ. Routine pre-operative blood testing: is it necessary? Anaesthesia. 2002 Sep;57(9):914-17. PMID: 12190758.
6. Pasternak LR. Preoperative testing: moving from individual testing to risk management. Anesth Analg. 2009 Feb;108(2):393-4. PMID: 19151262.
7. MacPherson RD, Reeve SA, Stewart TV, et al. Effective strategy to guide pathology test ordering in surgical patients. ANZ J Surg. 2005 Mar;75(3):138-43. PMID: 15777393.
8. Klein AA, Arrowsmith JE. Should routine pre-operative testing be abandoned? Anaesthesia. 2010 Oct;65(10):974-6. PMID: 21198466.
9. Fleisher LA, Beckman JA, Brown KA, et al. ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery) Developed in Collaboration With the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, and Society for Vascular Surgery. J Am Coll Cardiol. 2007 Oct 23;50(17):1707-32. PMID: 17950159.
10. Methods Guide for Effectiveness and Comparative Effectiveness Reviews. AHRQ Publication No. 10(12)-EHC063-EF. Rockville, MD: Agency for Healthcare Research and Quality; April 2012. Available at: http://www.effectivehealthcare.ahrq.gov/search-for-guides-reviews-and-reports/?pageaction=displayproduct&mp=1&productID=318.

11. Higgins JPT, Green S, eds. Cochrane handbook for systematic reviews of interventions. Version 5.1.0. London: The Cochrane Collaboration; March 2011. Available at www.cochrane-handbook.org.

VI. Definition of Terms

Not applicable.

VII. Summary of Protocol Amendments

No protocol amendments to date.

VIII. Review of Key Questions

For all Evidence-based Practice Center (EPC) reviews, Key Questions were reviewed and refined as needed by the EPC with input from Key Informants and the Technical Expert Panel (TEP) to assure that the questions are specific and explicit about what information is being reviewed. In addition, the Key Questions were posted for public comment and finalized by the EPC after review of the comments.

IX. Key Informants

Key Informants are the end-users of research, including patients and caregivers, practicing clinicians, relevant professional and consumer organizations, purchasers of health care, and others with experience in making health care decisions. Within the EPC program, the Key Informant role is to provide input into identifying the Key Questions for research that will inform health care decisions. The EPC solicits input from Key Informants when developing questions for systematic review or when identifying high-priority research gaps and needed new research. Key Informants are not involved in analyzing the evidence or writing the report and have not reviewed the report, except as given the opportunity to do so through the peer or public review mechanism.

Key Informants must disclose any financial conflicts of interest greater than $10,000 and any other relevant business or professional conflicts of interest. Because of their role as end-users, individuals are invited to serve as Key Informants and those who present with potential conflicts may be retained. The Task Order Officer (TOO) and the EPC work to balance, manage, or mitigate any potential conflicts of interest identified.

X. Technical Experts

Technical Experts comprise a multidisciplinary group of clinical, content, and methodological experts who provide input in defining populations, interventions, comparisons, or outcomes as well as identifying particular studies or databases to search. They are selected to provide broad expertise and perspectives specific to the topic under development. Divergent and conflicted opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, study questions, design, and/or methodological approaches do not necessarily represent the views of individual technical and content experts. Technical Experts provide information to the EPC to identify literature search strategies and recommend approaches to specific issues as requested by the EPC. Technical Experts do not do analysis of any kind nor contribute to the writing of the report and have not reviewed the report, except as given the opportunity to do so through the peer or public review mechanism.

Technical Experts must disclose any financial conflicts of interest greater than $10,000 and any other relevant business or professional conflicts of interest. Because of their unique clinical or content expertise, individuals are invited to serve as Technical Experts and those who present with potential conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any potential conflicts of interest identified.

XI. Peer Reviewers

Peer reviewers are invited to provide written comments on the draft report based on their clinical, content, or methodological expertise. Peer review comments on the preliminary draft of the report are considered by the EPC in preparation of the final draft of the report. Peer reviewers do not participate in writing or editing of the final report or other products. The synthesis of the scientific literature presented in the final report does not necessarily represent the views of individual reviewers. The dispositions of the peer review comments are documented and will, for CERs and Technical Briefs, be published 3 months after the publication of the Evidence Report.

Potential Reviewers must disclose any financial conflicts of interest greater than $10,000 and any other relevant business or professional conflicts of interest. Invited Peer Reviewers may not have any financial conflict of interest greater than $10,000. Peer Reviewers who disclose potential business or professional conflicts of interest may submit comments on draft reports through the public comment mechanism.

XII. EPC Team Disclosures

EPC core team members must disclose any financial conflicts of interest greater than $1,000 and any other relevant business or professional conflicts of interest. Related financial conflicts of interest that cumulatively total greater than $1,000 will usually disqualify EPC core team investigators.

XIII. Role of the Funder

This project was funded under Contract No. 290-2012-0012-I from the Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services. The Task Order Officer reviewed contract deliverables for adherence to contract requirements and quality. The authors of this report are responsible for its content. Statements in the report should not be construed as endorsement by the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.